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EXAMINER
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ENGLUND, TERRY LEE

ART UNIT	PAPER NUMBER
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2816

DATE MAILED: 10/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/808,635

Applicant(s)

TEO, SIEW SIONG

Examiner

Terry L. Englund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 March, 16 August, & 15 November, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>20040816</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Fig. 5 lacks “(VOUT)” disclosed on page 1, line 23. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as also failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Fig. 5’s “500” is not described in the disclosure. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any

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required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Figure 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated (e.g. page 2, line 24 discloses the figure “is an example waveform for a conventional band-gap circuit.”). See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

The applicant is reminded of the proper content of an abstract of the disclosure.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art. In the present abstract, the sentence on lines 10-13 cites “improved operating temperature ranges...when compared to a conventional band-gap circuit.” Therefore, it is suggested the abstract’s last sentence be deleted.

The abstract of the disclosure is objected to because “Customer No. 23552” is not necessary, and should be deleted. Correction is required. See MPEP § 608.01(b).

### *Claim Objections*

Claims 1-18 are objected to because of the following informalities: Both claims 1 and 14 need to have “bang-gap” on line 3 changed to --band-gap-- to correct a typo, thus ensuring

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consistent labeling throughout the claims. It is suggested “means at” within line 1 of claim 15 be changed to either --means includes at-- or --means comprises at-- to improve word flow. Claim 17, line 1 “reference” should be --referenced-- to also improve word flow. Dependent claims carry over any objection(s) from any claim(s) upon which they depend. Appropriate corrections are required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. It is not understood how the “temperature compensated reference signal” and the band-gap cell’s “first signal” within each of claims 1 and 14 relate to one another. Using the applicant’s own Fig. 2 as an example, if VBG is considered the “first signal” of band-gap cell R1-R3,Q1-Q2,A1, isn’t it also the “temperature compensated reference signal”, or is it only a portion of it? Other than selectively activating the PTAT circuit, it is not clear how the feedback circuit of claim 1 relates to anything else within the claim since a feedback circuit is typically associated with an output of something. Therefore, is it a feedback circuit with respect to the reference signal of the apparatus, the first signal of the band-gap cell, or the second signal of the PTAT circuit? Claim 2 is incomplete, indefinite, and lacks a period. For example, what does “such that the third temperature response profile” mean? Similar to claim 1 described above, it is not understood how “an output of the band-gap cell means” (line 7), “first signal” of the band-gap cell means (lines 3 and 9), and “temperature compensated reference signal” (lines

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1, 8-9, and 10) of claim 14 actually relate to one another. For example, aren't they all referring to the same output (i.e. signal)? Although claim 14's "sense means" senses the output, how does this sense means relate to the PTAT means and signal combination means also recited within the claims? It is not understood how "temperature compensated reference signal" (line 1) and "band-gap voltage" (lines 2 and 10) of claim 19 relate to one another. For example, do they refer to the same signal or voltage, such as VBG shown within the applicant's own Fig. 2?

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationship is how the second bipolar device relates to any of the other elements (e.g. first bipolar device, resistors, nodes, error amplifier, or resistor circuit) also cited within the claim.

Each of claims 15 and 16 recites the limitation "the PTAT means" in line 1. There is insufficient antecedent basis for this limitation in either claim. Were these claims meant to depend on claim 14 instead of claim 12?

Claim 17 recites the limitation "the band-gap cell means" in line 1 with insufficient antecedent basis for this limitation in the claim. Was this claim also meant to depend on claim 14?

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

In so far as being understood, claims 1-3, and 6-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Carvajal et al. (Carvajal). Fig. 2 shows an apparatus for providing temperature compensated reference signal VREF, wherein the apparatus comprises band-gap cell 26 providing a first signal, with respect to node 48 and transistor 62, having a first temperature response profile; PTAT circuit 46,50,52,R5 to selectively provide a second signal (with respect to node 53) having a second temperature response profile; feedback circuit R6,46 for effectively activating the PTAT circuit selectively (e.g. see column 4, lines 36-44); and resistor circuit RLT arranged with band-gap cell 26 and the PTAT circuit so temperature compensated reference signal VREF has a third temperature response profile determined by the first and second temperature response profiles. [Note: Although not clearly shown or disclosed by the reference, these temperature response profiles are understood by one of ordinary skill in the art to be related to operating temperature ranges, and by combining the first/second profiles, a third profile is obtained which allows the temperature compensated reference signal VREF to be maintained substantially constant over a wider temperature range (e.g. see related Fig. 3).] Therefore, claim 1 is anticipated. In order to help maintain a substantially constant temperature compensated reference signal over a wider temperature range, it would also be understood by one of ordinary skill in the art that the first and second temperature response profiles are different from one another (e.g. the first profile would relate to a moderate temperature range; the second profile would relate to a low temperature range; and the third profile would relate to the combined operation across the low and moderate temperature ranges), anticipating claim 2. The first signal is a current flowing through transistor 62, the second signal is a PTAT current flowing through

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transistors 50,52, and resistor circuit RLT is arranged to effectively combine these currents, anticipating claim 3. Since feedback circuit R6,46 is one type of at least a passive feedback circuit, voltage divider circuit, and resistor divider circuit, claim 6 is also anticipated. Feedback circuit R6,46 is a voltage divider type circuit that senses the output (with respect to node 48 and VREF) of band-gap cell 26, anticipating claim 7. Since PTAT circuit 44,50,52,R5 is one type of a current reference circuit providing the second signal as a current, claim 8 is anticipated. PTAT circuit 44,50,52,R5 provides the second signal as current that is proportional to absolute temperature (e.g. see  $I_{PTAT}$ ) with respect to at least one bipolar junction transistor (44, 50, and/or 52), anticipating claim 9. Interpreting the PTAT circuit in a slightly different manner, the second signal can be considered a voltage that is proportional to absolute temperature since it relates to the voltage drop across series connected transistors 44 and 52, as well as their associated PTAT current. This anticipates claim 10. When the PTAT circuit (e.g. transistor 50) is activated, the apparatus has reached temperature trip point  $t_0$  (e.g. see column 4, lines 35-45), anticipating claim 11. Since band-gap cell 26 is referenced from high supply signal VCC, and ground reference signal REFGND, claim 12 is anticipated. One of ordinary skill in the art would understand that temperature compensated reference signal VREF corresponds to at least a current (e.g.  $I_{PTAT}$ ) and a voltage (e.g. the voltage drop across series connected elements RLT,RHT,64-66,R8-10,72-74), and claim 13 is anticipated. Interpreting Fig. 2 in a different manner, band-gap cell means 26 provides a first signal, at node 48 with respect to transistor 62, with a first temperature response profile (i.e. within a moderate temperature range); PTAT means 44,50,52,R5 selectively provides a second signal (e.g. at node 53) with a second temperature response profile (i.e. within a low temperature range); sense means R6,46 senses output VREF of



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band-gap cell means 26; and resistor RLT effectively functions as a signal combination means to adjust temperature compensated reference signal VREF in response to the first/second signals to ensure signal VREF has a third temperature response (i.e. over the low and moderate temperature ranges) determined by the first and second temperature response profiles, thus anticipating claim 14. Applying the same type of reasoning as described previously with respect to claims 8, 9-10, 12, and 13, claims 15-18 are anticipated. In yet another interpretation of Fig. 2, the circuit provides a method for providing temperature compensated signal VREF, wherein band-gap cell 26 provides band-gap voltage VREF with a first temperature profile (i.e. within a moderate temperature range); R6,46 monitor band-gap voltage VREF to provide a feedback signal; the feedback signal is directly coupled to PTAT circuit 44,50,52,R5 that has a second temperature profile (i.e. within a low temperature range); the PTAT circuit is effectively activated when the operating temperature associated with band-gap cell 26 reaches temperature trip-point trip  $t_0$  (e.g. see column 4, lines 35-45); and a signal from the PTAT circuit is coupled to band-gap cell 26 to provide band-gap voltage VREF with a third temperature profile (i.e. over the low and moderate temperature ranges), anticipating claim 19. One of ordinary skill in the art would understand the first temperature profile would correspond to a band-gap curve (e.g. within a moderate temperature range with respect to band-gap cell 26); the second temperature profile would correspond to a proportional to absolute temperature curve (e.g. with respect to the PTAT current); and the third temperature profile would correspond to a curvature corrected band-gap curve (e.g. see related Fig. 3). Therefore, claim 20 is also anticipated.

***Prior Art***

The other prior art references cited on the accompanying PTO-892 are deemed relevant to at least sections of the claimed inventions. At least Price, Wong et al., and Marinca show/disclose circuitry, and/or a related method, for providing a temperature compensated reference signal with a third temperature response profile (e.g. see Price (Figs. 8-9), Wong et al. (Figs. 3 and 5A-5D), and Marinca (e.g. see Figs. 2-6)). Sutardja et al. shows a band-gap cell in Fig 1 closely corresponding to the band-gap cell and resistor (i.e. R1-R3, Q1-Q2, A1 and R4, respectively) shown in the applicant's own Fig. 2. Therefore, all of these references should be carefully reviewed and considered with respect to the broadest reasonable interpretation of the claimed limitations and of the references.

The prior art references cited on the IDS submitted Aug 16, 2004 were reviewed and considered. All of the references show/disclose at least a band-gap cell that provides one type of a temperature compensated reference signal. The US patents also show/disclose compensation type circuitry that will allow the overall circuit to provide a temperature compensated reference signal with respect to a third temperature response profile (e.g. a second order corrective curve). However, none of these references clearly shows or discloses the relationships between the selectively activated PTAT circuit (or PTAT means) and resistor circuit (or signal combination means) as recited in claim 1 (or 14).

No claim is allowable as presently cited.

***Allowable Subject Matter***

However, claims 4-5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations

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of the base claim and any intervening claims. There is presently no strong motivation to modify or combine any prior art reference(s) to ensure the band-gap cell comprises the specific relationships between the first bipolar device, first-third resistors, first-second sense nodes, common node, error amplifier, and resistor circuit as presently recited within claim 4, upon which claim 5 depends.

Any inquiry concerning this communication from the examiner should be directed to Terry L. Englund whose telephone number is (571) 272-1743. The examiner can normally be reached Monday-Friday from 7 AM to 3 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Callahan, can be reached on (571) 272-1740.

The new central official fax number is (571) 273-8300.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1562.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TLE

Terry L. Englund

11 October 2006

  
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